Amendments to the Claims:

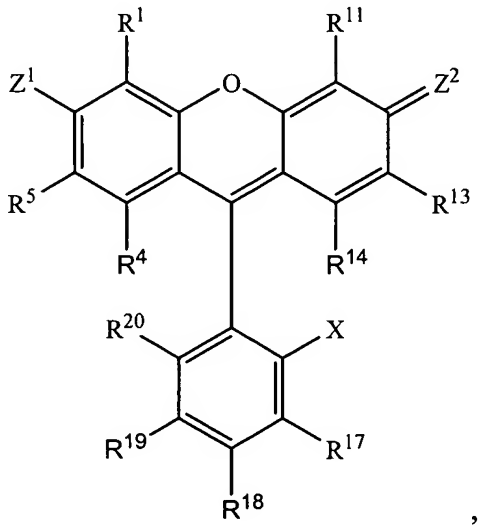
This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1 - 55. (Previously Cancelled)

56. (Previously Presented) A method of forming a labelled substrate comprising:

reacting a substrate selected from a polynucleotide, a nucleotide, a nucleoside, a polypeptide, a carbohydrate, a ligand, a substantially enantiomerically pure compound, a particle, and a surface, with the linking moiety of a substantially pure atropisomer compound having the structure:



,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR, and NR_2, X is selected from carboxylate and sulfonate; and at least one of R^1, R^4, R^5, R^{11}, R^{13}, R^{14}, R^{17}, R^{18}, R^{19}, R^{20}, Z^1, or Z^2 is a linking moiety selected from azido, monosubstituted primary amine, disubstituted secondary amine, thiol, hydroxyl, halide, epoxide, N-hydroxysuccinimidyl ester, carboxyl, isothiocyanate, sulfonyl chloride, sulfonate ester, silyl halide, chlorotriazinyl, succinimidyl ester, pentafluorophenyl ester, maleimide, haloacetyl, epoxide, alkylhalide, allyl halide, aldehyde, ketone, acylazide, anhydride, iodoacetamide, phosphoramidite and an activated ester,

whereby a labelled substrate is formed.

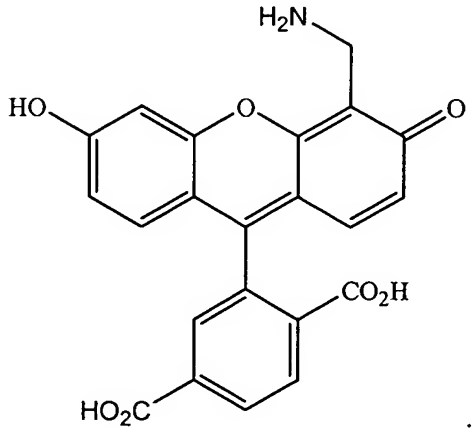
57. (Previously Presented) The method of claim 56 wherein the linking moiety is N-hydroxysuccinimide.

58. (Previously Presented) The method of claim 56 wherein the linking moiety is a phosphoramidite.

59. (Previously Presented) The method of claim 56 wherein the substrate is substantially enantiomerically pure.

60. (Previously Presented) The method of claim 56 wherein the substantially enantiomerically pure compound is (+)-menthyl chloroformate or (-)-menthyl chloroformate.

61. (Previously Presented) The method of claim 56 wherein the labelled substrate comprises C-11 aminomethyl, C-19 carboxyl fluorescein having the structure:

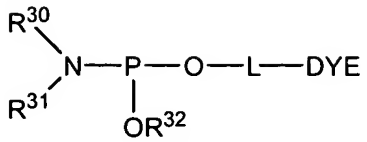


62. (Previously Presented) The method of claim 56 wherein the particle is a nanoparticle, a microsphere, a bead, or a liposome.

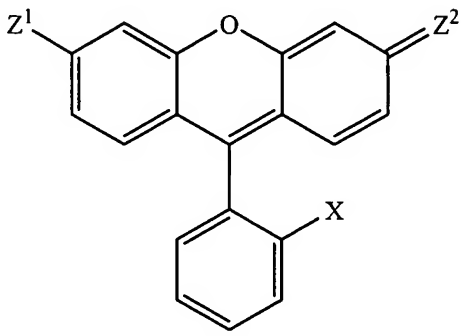
63. (Previously Presented) The method of claim 56 wherein the surface is glass.

64. (Previously Presented) A method of synthesizing a labelled polynucleotide comprising:

coupling a phosphoramidite compound of the structure:



wherein DYE is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate;

L is a linker;

R^{30} and R^{31} taken separately are selected from the group consisting of C_1-C_{12} alkyl, C_1-C_{12} cycloalkyl, and aryl; or R^{30} and R^{31} taken together with the nitrogen atom form a saturated nitrogen heterocycle; and

R^{32} is a phosphite ester protecting group,

to a polynucleotide, wherein the polynucleotide is bound to a solid support, whereby a labelled polynucleotide is formed.

65. (Previously Presented) A method of separating atropisomers of a C-11 aminomethyl, C-19 carboxyl fluorescein compound comprising:

(a) reacting a C-11 aminomethyl, C-19 carboxyl fluorescein with a substantially pure enantiomer of an active ester or carboxylic acid to form diastereomeric carbamates;

(b) separating the diastereomeric carbamates; and

(c) hydrolyzing the separated diastereomers with aqueous acid.

66. (Previously Presented) The method of claim 65 wherein the active ester is menthyl chloroformate.

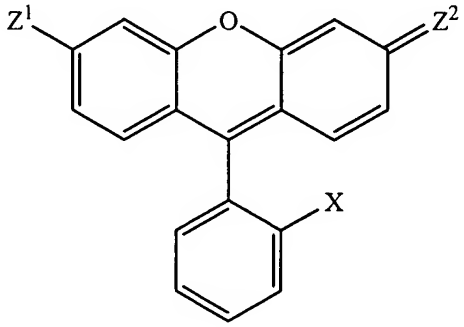
67. (Previously Presented) The method of claim 65 wherein the diastereomeric carbamates are separated by reverse-phase HPLC.

68. (Previously Presented) A method of separating a mixture of labelled substrates comprising:

(a) separating a mixture of labelled substrates by electrophoresis; and

(b) detecting the labelled substrates by fluorescence detection,

wherein the labelled substrates are comprised of a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.

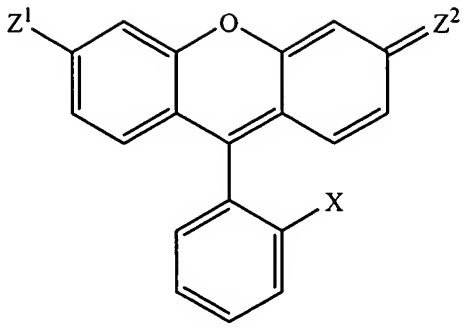
69. (Previously Presented) The method of claim 68 wherein the labelled substrates are labelled polynucleotides.

70. (Previously Presented) A method of separating a mixture of labelled substrates comprising:

(a) separating a mixture of labelled substrates by chromatography; and

(b) detecting the labelled substrates by fluorescence detection,

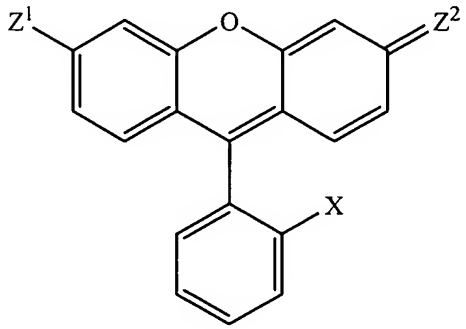
wherein the labelled substrates are comprised of a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.

71. (Previously Presented) A method of generating a labelled primer extension product, comprising the step of extending a primer-target hybrid with an enzymatically-incorporatable nucleotide, wherein said primer or said nucleotide is labelled with a substantially pure atropisomer of a xanthene compound having the structure:



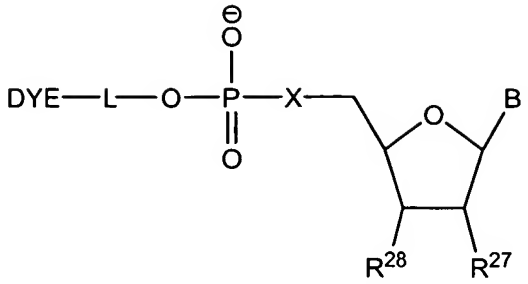
and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate,

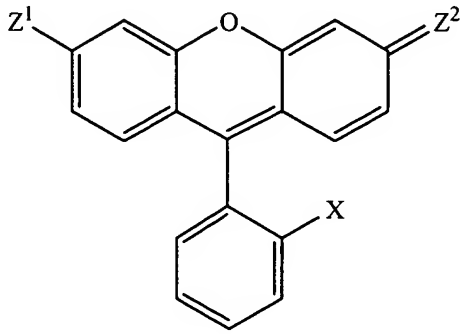
whereby the primer is extended.

72. (Previously Presented) The method of claim 71 wherein the nucleotide is enzymatically-extendable.

73. (Currently Amended) The method of claim 71 wherein the primer is a labelled polynucleotide ~~comprising~~ having the formula:



wherein DYE is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate;

B comprises a nucleobase;

X is selected from O, NH and S;

L comprises a linker;

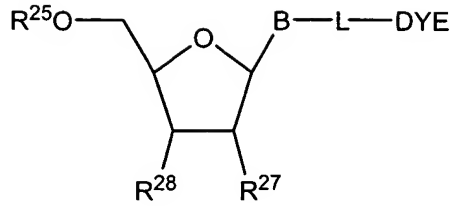
R^{27} is selected from H, OH, halide, azide, amine, alkylamine, C_1-C_6 alkyl, allyl, C_1-C_6 alkoxy, OCH_3, and $OCH_2CH{=}CH_2$; and

R^{28} is selected from an internucleotide phosphodiester and an internucleotide analog;

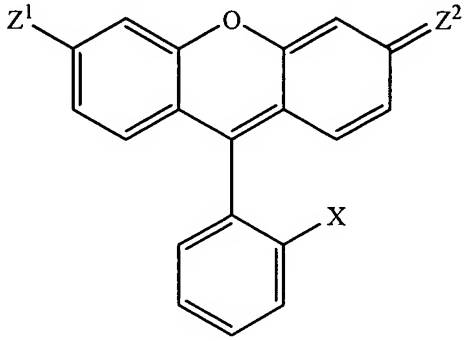
wherein the polynucleotide comprises 2 to 82 nucleotides.

74. (Previously Presented) The method of claim 73 wherein B is selected from the group consisting of uracil, thymine, cytosine, adenine, 7-deazaadenine, guanine, and 7-deazaguanosine.

75. (Currently Amended) The method of claim 71 wherein the enzymatically-incorporatable nucleotide is a labelled nucleoside or nucleotide having the formula:



wherein DYE is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate;

B ~~comprises~~ is a nucleobase;

L comprises a linker;

R^{25} is selected from H, monophosphate, diphosphate, triphosphate, thiophosphate, and phosphate analog; and

R^{26} and R^{27} are each independently selected from -H, -OH, -F and a moiety which blocks polymerase-mediated target-directed primer extension.

76. (Previously Presented) The method of claim 71 further comprising a terminator nucleotide.

77. (Previously Presented) The method of claim 75 wherein R^{26} and R^{27} are -H.

78. (Previously Presented) A method of polynucleotide sequencing comprising:

a) forming a mixture of a first, a second, a third, and a fourth class of polynucleotides, such that:

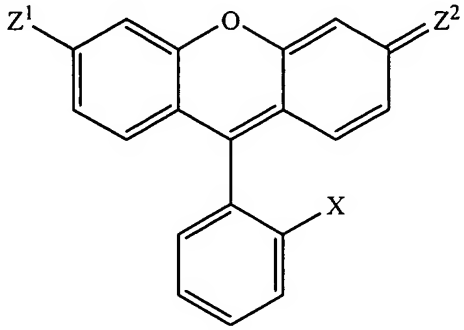
each polynucleotide in the first class includes a 3'-terminal dideoxyadenosine and is labelled with a first dye;

each polynucleotide in the second class includes a 3'-terminal dideoxycytidine and is labelled with a second dye;

each polynucleotide in the third class includes a 3'-terminal dideoxyguanosine and is labelled with a third dye; and

each polynucleotide in the fourth class includes a 3'-terminal dideoxythymidine and is labelled with a fourth dye;

wherein at least one of the first, second, third, or fourth dyes is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate, and the other dyes are spectrally resolvable from each other; and

b) separating the polynucleotides on the basis of size.

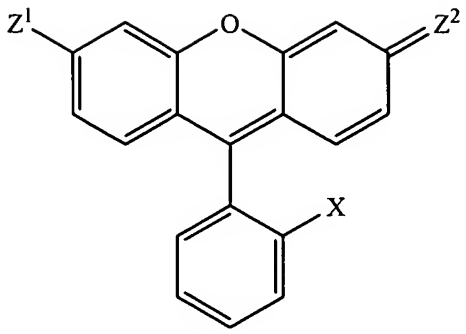
79. (Previously Presented) The method of claim 78 further comprising the step of detecting the separated polynucleotides by fluorescence detection.

80. (Previously Presented) The method of claim 78 further comprising the step of identifying the 3'-terminal nucleotide of the polynucleotides by the fluorescence spectrum of the dyes.

81. (Previously Presented) A method of oligonucleotide ligation, comprising:

annealing two probes to a target sequence and forming a phosphodiester bond between the 5' terminus of one probe and the 3' terminus of the other probe;

wherein one or both probes are labelled with a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

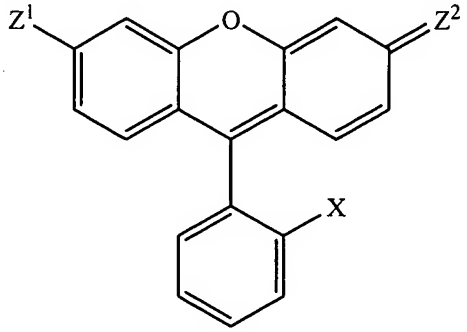
wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.

82. (Previously Presented) A method of fragment analysis comprising:

separating labelled polynucleotide fragments by a size-dependent separation process; and

detecting the separated labelled polynucleotide fragments subsequent to the separation process,

wherein the fragments are labelled with a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.

83. (Previously Presented) The method of claim 82 wherein the fragments are labelled with a mobility-modifying label.

84. (Previously Presented) The method of claim 82 wherein the fragments are formed by ligation.

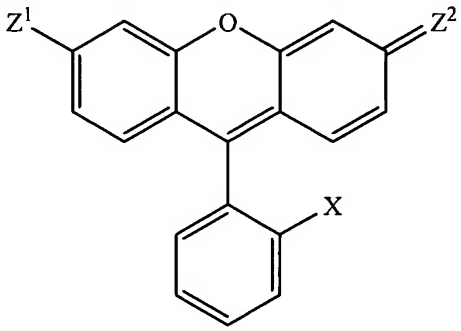
85. (Previously Presented) The method of claim 82 wherein the size-dependent separation process is electrophoresis and the labelled polynucleotide fragments are detected by fluorescence.

86. (Previously Presented) A method of amplification comprising:

annealing two or mo re primers to a target polynucleotide; and

extending the primers by a polymerase and a mixture of enzymatically-extendable nucleotides;

wherein at least one of the primers is a labelled polynucleotide comprising a polynucleotide covalently attached to a label, wherein the label is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

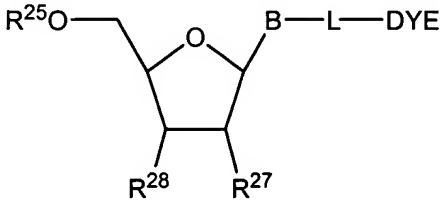
wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.

87. (Previously Presented) A method of amplification comprising:

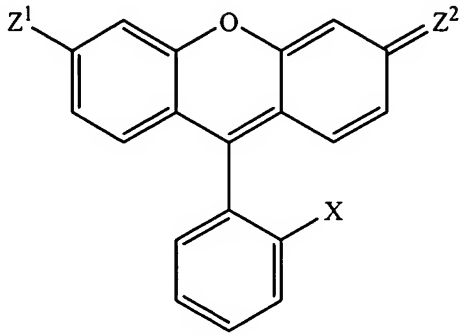
annealing two or more primers to a target polynucleotide, and

extending the primers by a polymerase and a mixture of enzymatically-extendable nucleotides;

wherein at least one of the nucleotides is a labelled nucleotide having the formula:



wherein DYE is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate;

B comprises a nucleobase;

L comprises a linker;

R^{25} is selected from monophosphate, diphosphate, triphosphate, thiophosphate, and phosphate analog; and

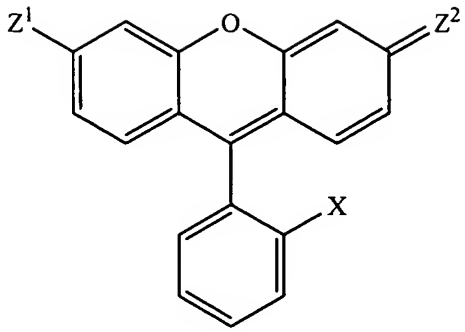
R^{26} and R^{27}, when taken alone, are each independently selected from -H, -OH, -F and a moiety that blocks polymerase-mediated target-directed primer extension.

88. (Previously Presented) A method of amplification comprising:

annealing two or more primers and a fluorescent dye-quencher probe to a target nucleic acid; and

extending the primers by polymerase and a mixture of enzymatically-extendable nucleotides;

wherein the probe is a labelled polynucleotide comprising a polynucleotide covalently attached to a label, wherein the label is a substantially pure atropisomer of a xanthene compound having the structure:



and aryl-substituted forms thereof,

wherein Z^1 and Z^2 are each independently selected from O, OH, NH_2, NHR and NR_2, X is carboxylate or sulfonate.